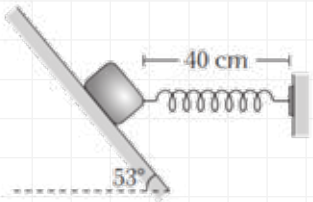
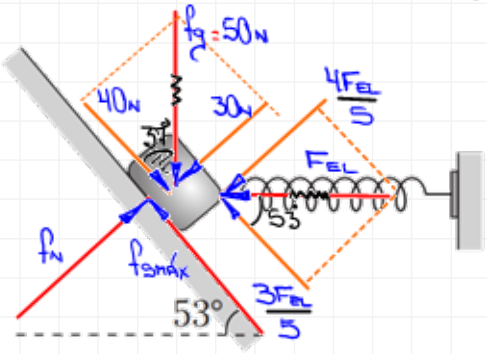
PRÁCTICA DIRIGIDA

1. Un bloque sólido de 5 kg se presiona contra un plano inclinado mediante un resorte de 50 cm de longitud natural. El coeficiente de fricción estático entre el bloque y el plano inclinado es 0,5. Calcule el valor mínimo, en N/m, que debe tener la constante elástica del resorte horizontal para que el bloque se mantenga en reposo. ($g=10\ m/s^2$)

A) 100
B) 150
C) 200
D) 250
E) 300





$\therefore f_N = 30 + \frac{4F_{EL}}{5}$

$\therefore f_{smáx} + \frac{3F_{EL}}{5} = 40$

$\mu_s f_N$

$0{,}5\left(30+\frac{4F_{EL}}{5}\right)+\frac{3F_{EL}}{5}=40$

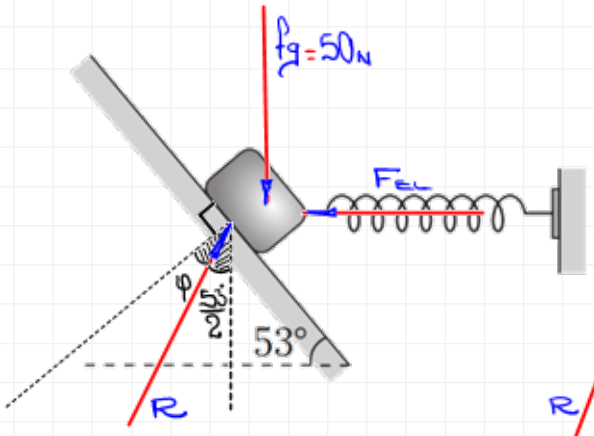
$F_{EL} = 25N$

Kx

$x = L_0 - L_f = 10cm = 0{,}1m$

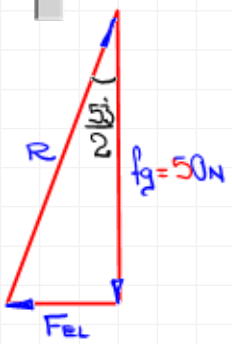
$K(0{,}1) = 25$

$\therefore K = 250\ N/m$



$\tan\varphi = \mu_s = 0{,}5$

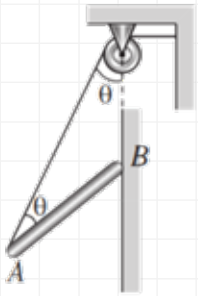
$\varphi = 53°/2$

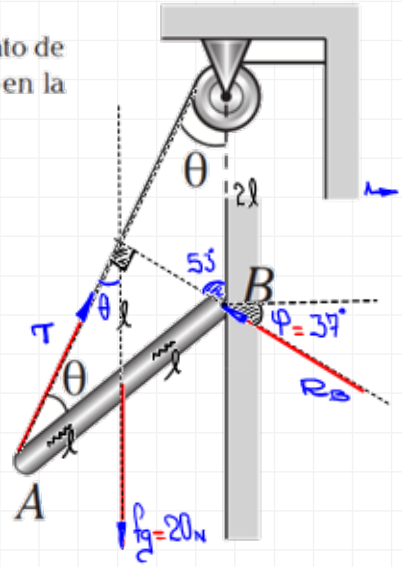


$F_{EL} = 25N$

2. Si la barra homogénea de 2 kg está a punto de resbalar ($\mu_s=0{,}75$) determine la tensión en la cuerda. ($g=10\ m/s^2$)

A) 8 N
B) 10 N
C) 16 N
D) 30 N
E) 42 N

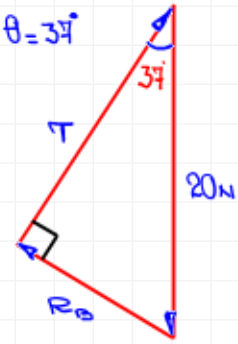




$\tan\varphi = \mu_s = 0{,}75$

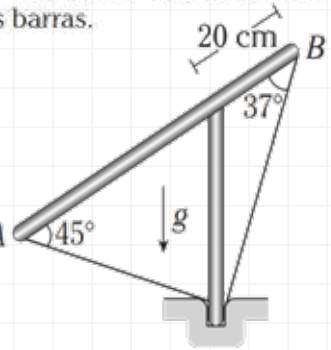
$\varphi = 37°$

$\theta = 37°$

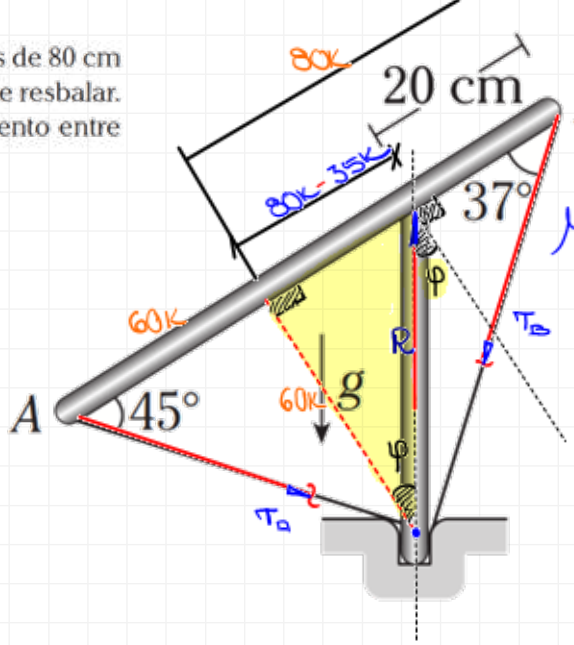


$\therefore T = 16N$

3. La barra *AB* de masa despreciable es de 80 cm do longitud y se encuentra a punto de resbalar. Determine el coeficiente de rozamiento entre ambas barras.



A) 0,5
B) 0,6
C) 0,75
D) 0,8
E) 0,4

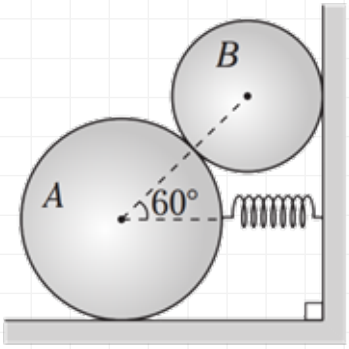


80cm = 140K
20cm = 35K

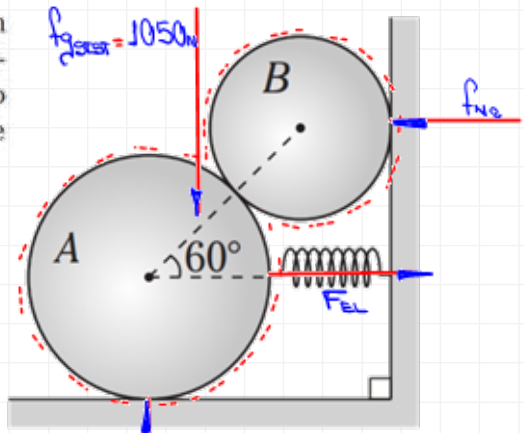
$\mu_s = \tan\varphi = \frac{45K}{60K}$

$\therefore \mu_s = 0{,}75$

4. En el sistema, los dos cilindros lisos *A* y *B* en reposo son de masas 75 kg y 30 kg, respectivamente. Determine aproximadamente cuánto está estirado, en cm, el resorte horizontal de constante de elasticidad 850 N/m.

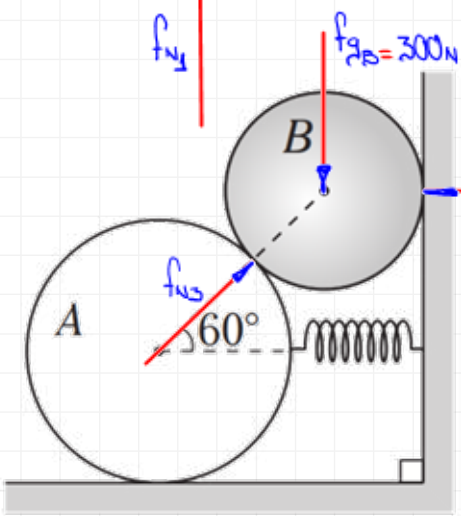


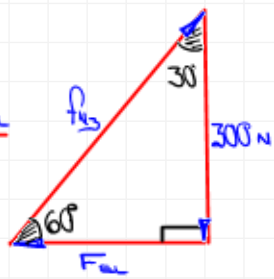
A) 10
B) 12
C) 15
D) 20
E) 25



$f_{N_1} = 1050N$

$f_{N_2} = F_{EL}$





$F_{EL} = 100\sqrt{3}\,N$

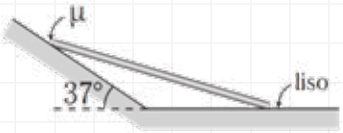
$850x = 100\sqrt{3}$

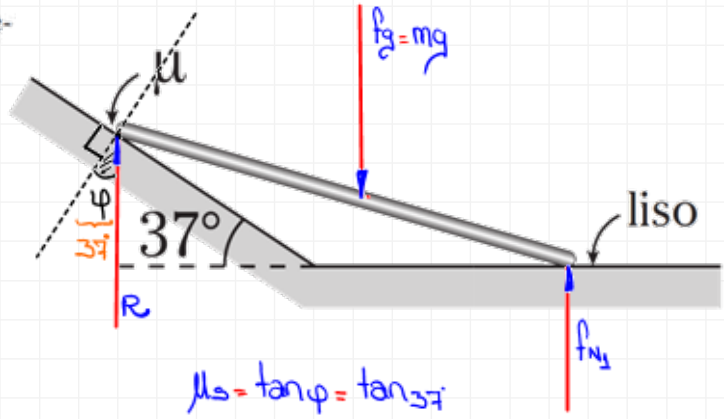
$x = 0{,}204\,m$

$= 20{,}4\,cm$

5. En la figura mostrada, la barra homogénea de masa m, se encuentra a punto de deslizar, determine el coeficiente de rozamiento μ. ($g = 10\ m/s^2$)

A) 0,5
B) 0,6
C) 0,8
D) 0,75
E) 0,65





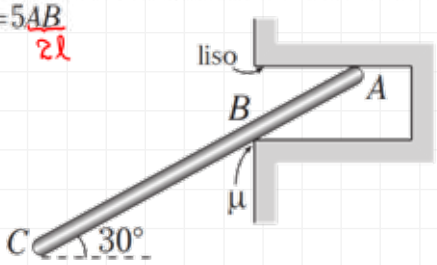
$\mu_s = \tan\varphi = \tan 37°$

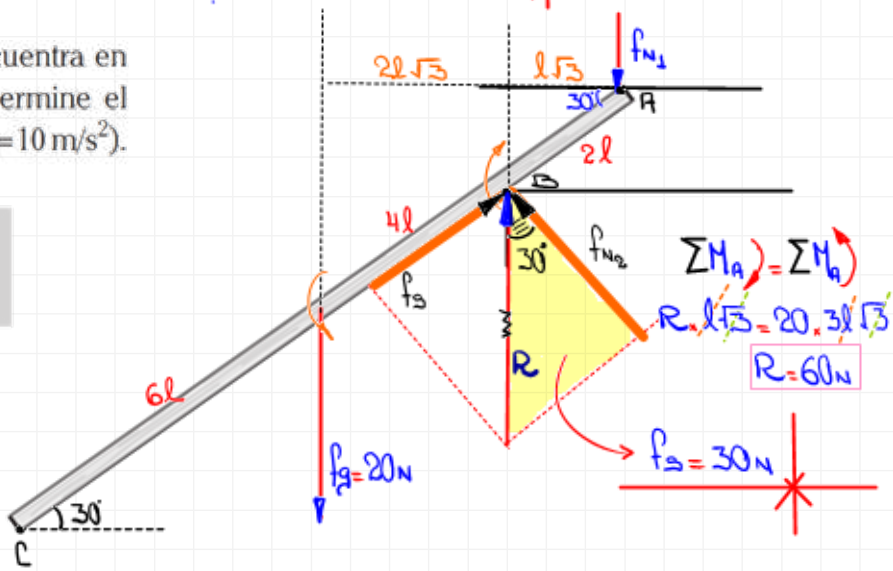
$\therefore \mu_s = 0{,}75$

6. La barra homogénea de 2 kg se encuentra en equilibrio tal como se muestra, determine el módulo de la fuerza de rozamiento ($g = 10\ m/s^2$).

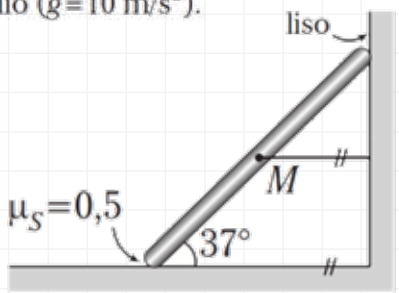
$\frac{BC}{10\ell} = \frac{5AB}{2\ell}$

A) 20 N
B) 30 N
C) 40 N
D) 50 N
E) 60 N

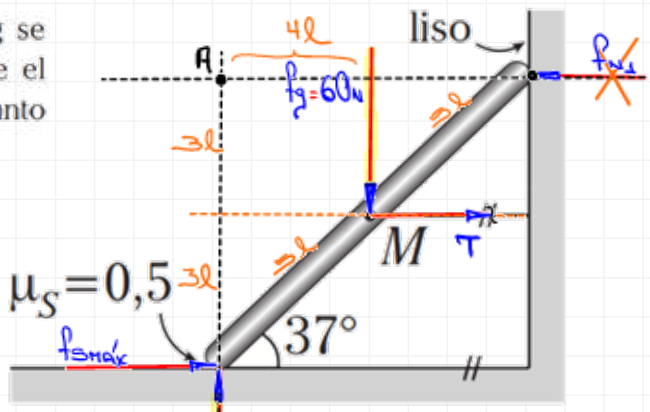




7. En la figura, la barra homogénea de 6 kg se encuentra a punto de deslizar, determine el módulo de la tensión en la cuerda, M: punto medio ($g = 10\ m/s^2$).



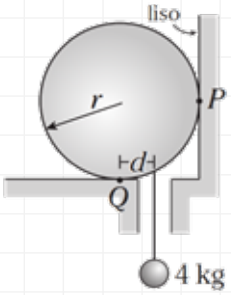
A) 15 N
B) 20 N
C) 25 N
D) 30 N
E) 25 N



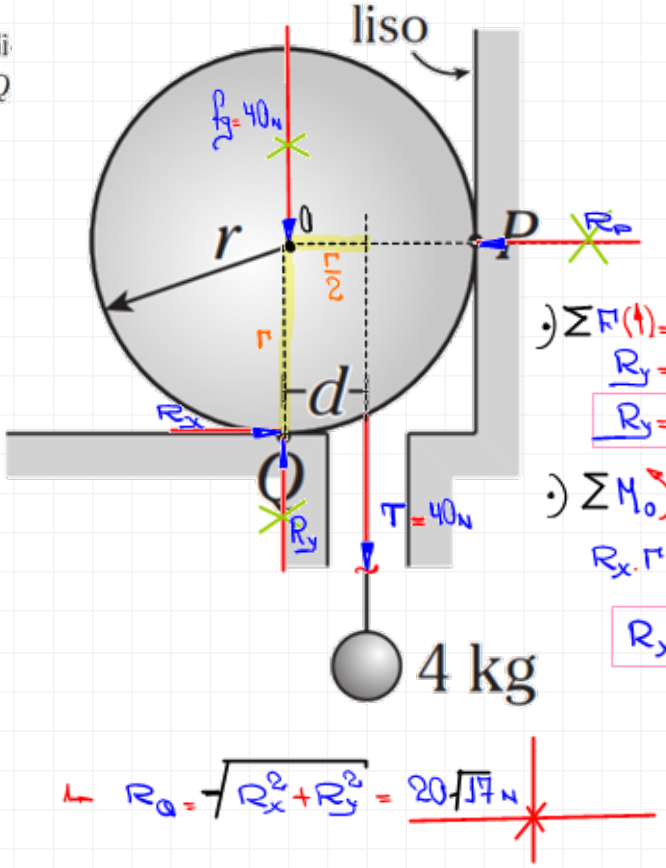
$f_{max} = \mu_s f_N$
$f_{max} = 0{,}5 \times 60$
$f_{max} = 30N$

$\sum M_A) = \sum M_A)$
$30 \times 6\ell + T \cdot 3\ell = 60 \times 4\ell$
$\therefore T = 20N$

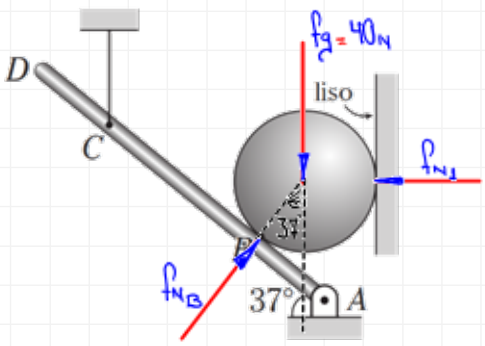
8. Si la esfera homogénea de 4 kg está en equilibrio, determine el módulo de la reacción en Q. ($g = 10\ m/s^2$; $d = r/2$)



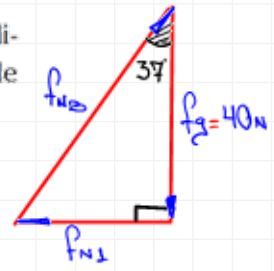
A) $10\sqrt{17}$ N B) 85 N C) 65 N
D) $20\sqrt{17}$ N E) 50 N

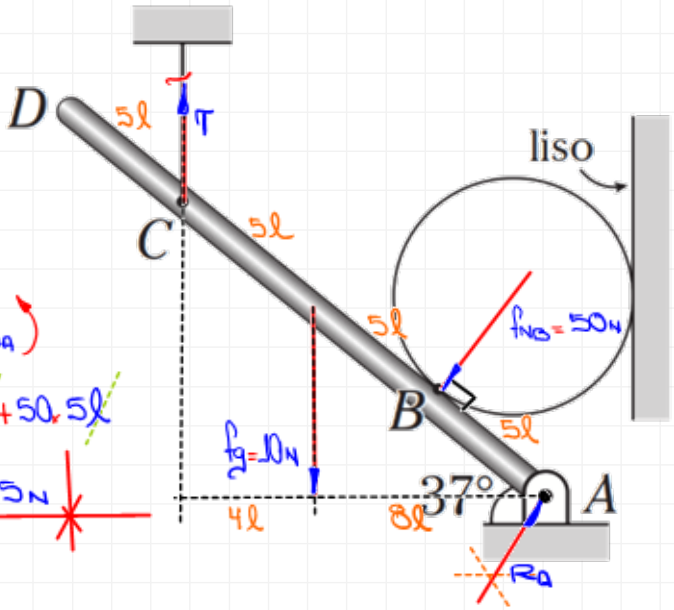


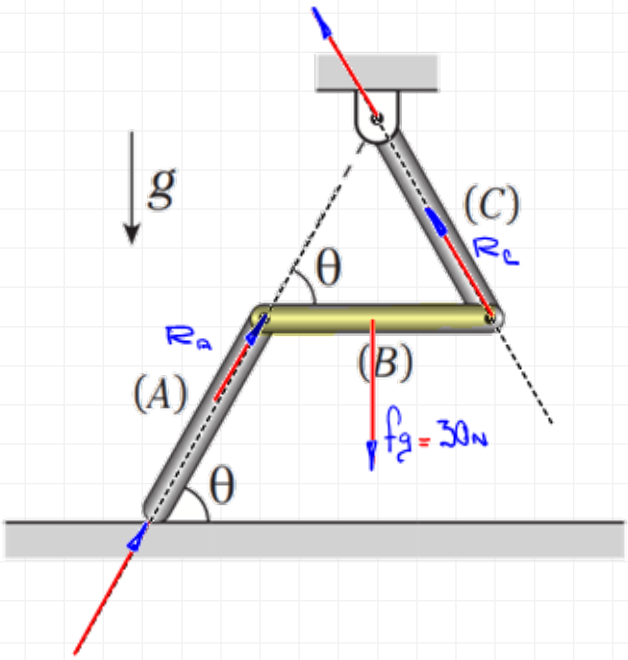
9. La esfera homogénea de 4 kg está en equilibrio apoyada sobre la barra homogénea de 1 kg. Determine la tensión en la cuerda. ($AB = DC$; $CB = 2AB$; $g = 10 m/s^2$)

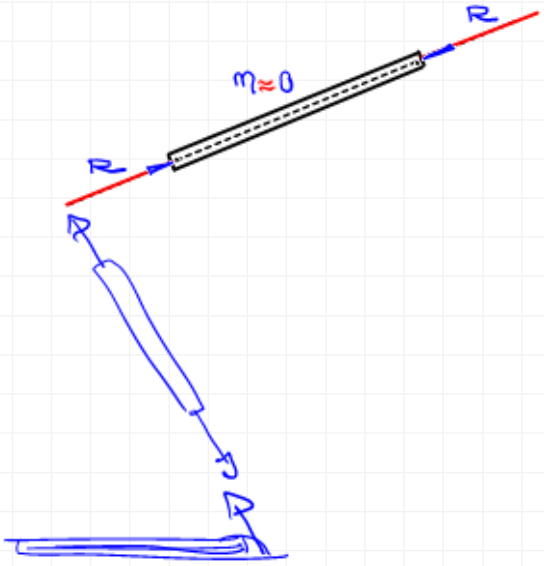


A) 10 N B) 27,5 N C) 30 N
D) 40 N E) 50 N






g
θ
(C)
R_c
R_a
(A)
(B)
$f_g = 30_N$
θ


R
m≈0
R